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ABSTRACT

Demographic prediction of juvenile delinquency has been hampered by the heterogeniety of youth samples. In an attempt to correct for sampling bias in predicting juvenile delinquency, 1,689 male and female youths(aged 12 to 19, drawn from a 6 percent systematic, census tract, random sample of Pennsylvania school youths) completed the Youth Needs Survey questionnaire which included demographic variables and a self-reported delinquency scale (SRD). Analyses of the questionnaire data were performed on the complete sample and on low, medium, and high SRD subsets. The data showed that different SRD predictive patterns were produced depending on the data set considered. For the general sample, only age (older) and sex (male) were predictive of higher SRD scores. Analysis of the general sample yielded 58.5 percent, 19.3 percent, and 54.7 percent correct classification of these respective groups into low, medium, and high SRD groups from age and sex. However, of all youths classified as high delinquent, 7.12 percent were false positives. Of all youths predictively classified as non-high delinquent, 15.2 percent were false negatives. Grade level was SRD predictive within the low delinquent group, with a slight tendency for higher grade levels to be associated with higher SRD scores. In the medium delinquency group, males were associated with higher SRD scores, and within the high delinquency group, active welfare status was predictive of higher SRD scores. (Author/BL)

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Demographic Prediction of Juvenile Delinquency Across and Within Delinquency Levels

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Abstract

Data obtained from questionnaires including demographic variables and a self-reported delinquency scale (SRD) administered to 1,689 male and female youths, ages 12 to 19 years, were analyzed to determine if SRD predictive patterns would vary as a function of delinquency level data sets: the complete sample, and low, medium, and high SRD subsets. Stepwise discriminant function analysis of the general sample yielded 58.5%, 19.3%, and 54.7% correct classification of these respective groups into low, medium, and high SRD groups from age and sex. However, of all youth classified as high delinquent, 71.2% were false positives. Of all youth predictively classified as non high delinquent 15.2% were false negatives. Stepwise multiple regression patterns did vary as a function of SRD level but showed low $\underline{R}$'s for SRD subsets compared with that of the general sample ($\underline{R}$ = .25). Grade, sex (male), and active welfare status were slightly predictive within low, middle, and high SRD groups respectively. It is recommended that other sets of predictor variables be studied within delinquency level categories.

Demographic Prediction of Juvenile Delinquency Across and Within Delinquency Levels

The relationship between demographic variables and delinquency level has been a heavily worked area of investigation for many years. For example, socioeconomic factors have been studied by Kelly (1972), and by West (1975). Welfare status and residence building type have been examined by Gillis (1974). Age has been studied by Sabatino (1974), and sex by Sabatino (1974) and Yahraes (1978). However, given the somewhat heterogeneous composition of youth samples and demographic variables linked to juvenile delinquency, it is rather difficult to determine the relative predictiveness of a consistent set of demographic variables related to a standard measure of delinquency.

The research reported herein attempts to correct for problems of sample and measure heterogeniety. The measure of delinquency used here is based on the responses of youth to a self-reported delinquency (SRD) scale contained in a general Youth Needs Survey Questionnaire (Elliot et. al., 1976) which also includes a demographics section. It should be pointed out here that reliance on confidential self-reports seems the only feasible method of measuring delinquency in a large general youth sample. Objective "official" information such as obtained from court records, simply does not exist for most youth. Furthermore, social network confirmatory investigation would be threatening, impractical, and these days, financially unsupportable. Fortunately, much psychometric contextual evidence (Brennan & Huizinga, 1975; Truckenmiller, Skok, & Lennon, 1978) supports the construct validity of the SRD scale, such supportive results being highly unlikely had the respondents been answering questions in a generally invalid fashion.

Other methodological considerations include the level of data obtained (nominal, ordinal, interval, ratio) and the appropriate statistical analyses to apply. Although chi square analyses are often performed on categorical data in demographic studies, correlational analyses can be performed where one variable is dichotomous and the other is continuous. The appropriate correlation in such cases is a point-biserial correlation (Guilford, 1965). Pearson product-moment correlation computer programs applied to a dichotomous and a continuous variable will produce a point-biserial *r* (Guilford, 1965). Stepwise multiple regression analyses based on correlations can determine the order and extent of predictive magnitude for predictor variables while controlling for correlation amongst the predictor variables. An analysis of this sort is not possible via a series of chi square computations. Consequently, continuous data was not reduced to categorical data for application of chi square. Data analysis presented here includes dichotomous and roughly interval level data.

We are not so much interested in the pinpoint accuracy of SRD score prediction from demographics, or a series of cross-tabular frequency distributions, but rather in the order of predictive extraction of demographic variables by data set and a rough estimate of demographic - SRD predictive power. Thus, very strict adherence to constraints of multivariate normality, and corrections of correlations obtained for the restricted SRD ranges encountered in low, medium, and high SRD groups, were deemed unnecessary for the present purposes. Accordingly, regression equations are neither reported nor commented upon.

Stepwise discriminant function analysis is an alternative to stepwise multiple regression for successively extracting variables in order of predictive power. It has the advantage of producing a cross tabular table showing

the percentage of correct predictions, false positives, and false negatives. The authors deemed it informative to employ stepwise discriminant function analysis only where modest correlations were encountered in stepwise multiple regression analyses. Where small *R*'s are concerned, a discriminant function analysis will only confirm the obvious fact of extremely low predictive utility, the exact percentages adding little additional useful information.

Method

Subjects

The subjects were youth from one of seven county areas that took part in a Pennsylvania Youth Service System project (Lombardo, 1977; Truckenmiller, Skok, & Lennon, 1978). There were 1,689 males and females, ages 12 to 19, drawn from a 6% systematic, census tract, random sample of school youth.

Materials

Materials and measures were part of an extensive package contained in the Youth Needs Survey Questionnaire (Elliott et. al., 1976). Demographics and SRD scores were extracted for the present analysis. Demographic variables included in the analysis were as follows: sex; grade, 6 through 12; residence tenure, ranging from less than one year to more than four years; educational level of the family head, ranging from grade school to post-graduate or professional training; mother living at home, yes or no; father living at home, yes or no; the number of children living at home; and welfare status, yes, no, or don't know. With the exception of welfare status, all of these variables were either dichotomous or continuous. Since extremely few of the responses to welfare status fell in the "I don't know" category, this variable was considered as dichotomous for practical purposes of the present investigation. The SRD scale, which serves as the dependent variable, is continuous with acceptable interval

level data scale properties (Brennan & Huizinga, 1975). SRD cutpoints for low, medium, and high delinquency groups were fixed ± .5 SRD standard deviations from the SRD mean.

Procedure

Two analyses of the general sample were performed: a multiple stepwise discriminant function analysis relating demographics to low, medium, and high SRD categories; and a stepwise multiple regression analysis of demographic variables on the full range of SRD scale scores. Next, stepwise multiple regression analyses of demographics on SRD scores were run within low, medium, and high SRD subsamples. All analyses were performed using BMDP computer programs.

Results

Stepwise multiple regression analyses produced different SRD predictive patterns depending on the data set considered. Only results of the general sample were deemed sufficiently significant for further analysis via stepwise discriminant function analysis. Table 1 gives a summary of the stepwise multiple regression analysis performed on the general sample. Table 2 shows the results of the stepwise multiple discriminant function analysis conducted on the general sample. It gives the percentage correct classification of low, middle, and high SRD subjects into their proper groups as predicted from age and sex. It also gives the percentages of false positives and false negatives for all those predicted into each SRD group on the basis of age and sex. Table 3 summarizes results of the stepwise multiple regression analyses performed within low, middle, and high SRD groups.

Insert Tables 1 through 3 about here

In Table 1, it can be seen that for the general sample, only age (older) and sex (male) were successively extracted as predictors of SRD scores (higher). Age correlated r = .19 with SRD. Adding sex yielded a multiple correlation of R = .25 with SRD scores, and a multiple shared variance with SRD of 6.28% (R^2 = .0628).

In Table 2 showing results of the stepwise multiple discriminant function analysis, it can be seen that 58.8%, 19.3% and 54.7% of the actual low, medium, and high SRD groups could be correctly classified as such on the basis of age and sex. However, of all the youth predictively classified into the low SRD group, 50.6% were false positives coming from the actual middle and high delinquency groups. For the middle SRD and high SRD projections, 52.9% and 71.2% were false positives respectively. With respect to false negatives viewed from after the fact of predictive classification, 26.5% of all youth predictively classified as non low SRD actually came from the low SRD group. Of all those predictively classified non middle SRD, 42.2% came from the middle SRD group. And of all those predictively classified as non high SRD, only 15.2% came from the actual high SRD group.

In Table 3 summarizing stepwise multiple regressions of demographic variables on SRD scores within low, middle, and high SRD groups, it can be seen that different predictors emerged for each group, and that demographic predictive power, although statistically significant in each case, was also quite low in each case. Only grade was SRD predictive within the low delinquency group showing a slight tendency for higher grade levels to be associated with higher SRD scores (R = .124, $p < .001$, 2 tail). Only sex was SRD predictive within the medium delinquency group (R = .11, $p < .001$, 2 tail) with a slight tendency for male sex to be associated with higher SRD scores. Within the high delinquency group, only welfare status was SRD predictive (R = .13, $p < .001$, 2 tail, with

a slight tendency for those youth reporting active welfare status to have higher SRD scores.

Discussion

As might be expected, SRD prediction from demographics was best for the general sample. And here, accuracy of prediction was greater when projecting into 3 levels of delinquency via stepwise multiple discriminant function analysis, yielding an overall 41% correct classification (Table 2), as opposed to predicting particular SRD scores via stepwise multiple regression (Table 3). In the latter case, only 6% of the variance was shared between age and sex when multiply correlated with SRD scores. A corresponding index of forecasting efficiency (Guilford, 1965) of $\underline{E}$ = 3% showed that the percentage reduction of errors of prediction by virtue of correlation between predictor and dependent variables would amount to only 3%. Thus, a knowledge of age and sex seems of little utility for estimating discrete SRD scores.

An inspection of Table 2 illuminates the different sorts of errors to be encountered in predicting low, middle, and high SRD categories from a knowledge of age and sex. Basically, predicting youth to fall in the high SRD group on the basis of age and sex is far more likely to entail false positives than false negatives. For any preventive program, for example, employing age and sex as proxy identifiers of delinquent youth, it would be far less safe to say who is likely to be highly delinquent than who is not likely to be highly delinquent. That is, 71.2% of all those youth predicted to be highly delinquent will have been misjudged, whereas only 15.2% of all youth given a clean bill of health, as it were, would turn out to have been highly delinquent.

Turning now to demographic prediction of discrete SRD scores within delinquency levels, Table 3 clearly shows that different predictors are obtained

depending on the delinquency level in question, and that predictive utility is very low given that one has already divided youth into low, medium, and high SRD groups. For the low SRD group, grade (highly correlated with age) is the only significant SRD score predictor (r = .12). The corresponding index of forecasting efficiency, E = .7%, shows that the percentage reduction of errors in SRD score prediction by virtue of correlation between grade and SRD amounts to only .7%. For the middle delinquency group, sex is the only significant predictor of discrete SRD scores (r = .11) yielding E = .6%. For the high delinquency group, welfare status, a critical cutpoint in SES, emerges as the only statistically significant predictor of discrete SRD scores (r = .13, E = .8%).

In the main, it seems that demographics may be of modest utility as proxy variables for classifying members of a general youth sample into the broad categories of low, medium, and high delinquency levels. However, the demographics studied here appear to show very little utility as predictors of more finely scaled measures of delinquency reflected in discrete SRD scores for either the general sample or within delinquency levels. If delinquency level bears such modest, and even marginal relationships to demographics such as age, sex, and welfare status, the obvious question remains as to what other variables might be associated with delinquency level and what their relative predictive utilities are.

There is some information bearing on this question. Using the same subjects sampled for the present study, Truckenmiller (Note 1) found that 70% of the low SRD group, 41.1% of the middle SRD group, and 72.6% of the high SRD group, could be correctly classified via stepwise discriminant function analysis into their

respective categories on the basis of their HEW community program Impact Scale (Brennan & Huizinga, 1975) scores. The predictive scales were those measuring peer pressure towards delinquency, social alienation, negative labeling by others, and to a slight extent by self-esteem in that order. False positives for high delinquency far exceeded falso negatives, 46% and 16.9% respectively. On the whole, predictive success using Impact Scales was much better than that obtained via demographics in the present study. Thus, there was some support for West's (1975) contention that sc ial alienation is related to delinquency.

Perceived blockage of access to desirable social roles, that is educational and occupational roles, has also been advanced as a factor associated with delinquency (McCandless, et. al., 1972). However, in several studies (Truck-enmiller, 1979, 1982, Note 1, Note 2) such expectations were not confirmed. In these studies HEW Community Program Impact Scales measuring youth perceived access to educational and occupational roles were unrelated to SRD. Thus, SES as measured by welfare status seems a bette predictor, though only very marginally so, of SRD than does perceiv d blockage of access to educational and occupational roles. This is not to say that actual school performance is unrelated to delinquency, for according to Kelly (1972) there is a strong relationship regardless of class position. Frease (1973) also contends that academic performance is a vastly superior predictor of delinquency than is class origin.

Our present results do not support Cohen's theory (cited in Kelly, 1972) of a strong relationship between lower social-class origins and delinquency. However, it should be mentioned that results supportive of Cohen's theory have been obtained from official police statistics whereas the present results were

obtained from self-reports. Such a discrepancy in findings, varying with the use of official police records as opposed to self-reports, has been documented by West (1975) who found SES and delinquency to be strongly related based on official records, but weakly so based on self-reports.

The question arises as to whether official records or self-reports are a better source of data. A number of other investigations favor the use of self-reports. Erickson (1973) notes that the accuracy of official records on crime and juvenile delinquency has been questioned for many years. He goes on to say that the cumulative evidence suggests that official records are probably critically biased in a number of ways, and that consequently, many criminologists view official records to be inadequate for most scientific purposes. Garrett & Short (1975) comment that police see lowerclass boys as more likely to be involved in delinquent conduct than boys with other family and social class backgrounds. West (1975) suggests that police tend to visit harder sanctions upon youths who display working-class characteristics and that such practices are carried over into the courts, accounting for the overrepresentation of working-class youngsters in the official statistics. Glaser (1979) summarized the situation as one in which the usual conclusions from official arrest and conviction records linking the lowest socioeconomic group with the highest delinquency and crime rates is unsupported by data that is unbiased by the selectivity of the police and courts. In general, the finding of the present study, that there is little significant relationship between SES, and self-reported juvenile delinquency, is supported by the above and other literature relating delinquency level to SES (Duke & Duke, 1978; Linden, 1978; West, 1975, and Yahraes, 1978.

In conclusion, we have seen that demographic variables age and sex are modest predictors of general delinquency level (low, middle, and high), and that while predictive patterns do vary within low, middle, and high delinquency groups, the utility of predicting more refined delinquency scores from demographics here considered is very weak. Further research might focus on the comparative utility of demographics and other variables in predicting delinquency as well as expanding the number and type of variables for predictive analysis within low, middle, and high delinquency groups.

Footnotes

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The authors contributed equally to this manuscript and are listed in alphabetical order.

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Table I

Results of the Stepwise Linear Multiple Regression Analysis of Age and Sex on Self-reported Delinquency (SRD) Scores for the General Youth Sample:

Demographic Predictor	Multiple $\underline{R}$	$\underline{R}^2$	Increase in $\underline{R}^2$
Age	.1944	.0378	
Sex	.2505	.0628	.0250

Table 2

Results of Stepwise Discriminant Function Analysis for the General Sample: Percent of Correct Classifications within Actual Low, Middle and High SRD Groups Along with False Positives and False Negatives as a Percentage of All Those Predicted into Each SRD Group on the Basis of Age and Sex:

SRD Level	Percent Correct Classification	Percent False Positives	Percent False Negatives
Low	58.8%	50.6%	26.5%
Middle	19.4%	52.9%	42.2%
High	54.7%	71.2%	15.2%

Table 3

Results of the Stepwise Multiple Linear Regression Analysis of Demographics on Self-Reported Delinquency (SRD) Scores within Low, Middle, and High SRD Groups:

Delinquency Level	Demographic Predictor	Multiple $\underline{R}$	$\underline{R}^2$
Low	Grade	.1240	.0154
Middle	Sex	.0168	.0114
High	Welfare Status	.1291	.0167